

**Notice of Allowability****Application No.**

08/479,810

**Examiner**

MARK KOPEC

**Applicant(s)**

BEDNORZ ET AL.

**Art Unit**

1761

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amend/Remarks filed 02/22/11.
2. ☒ The allowed claim(s) is/are 1-679.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some\* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 07/053,307.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date 05/01/98
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413),  
Paper No./Mail Date 06/20/11.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

/Mark Kopec/  
Primary Examiner, Art Unit 1761

This application is a CON of S.N. 08/303,561 (filed 09/09/94), which application is a CON of S.N. 08/060,470 (filed 05/11/93, now ABN), which application is a CON of S.N. 07/875,003 (filed 04/24/92, now ABN), which application is a DIV of S.N. 07/053,307 (filed 05/22/87, now ABN).

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 07/053,307, filed on 05/22/87.

The amendment filed **02/22/11** is entered. Claims 1-659 are pending. Note that all **non-elected claims** (e.g. 73-76, 82, 83, 377 and 378) have been rejoined.

A completed/corrected copy of the **IDS** filed 05/01/98 is attached.

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Update the **CON data** at **page 1** of the specification to the following:

-- This application is a CON of S.N. 08/303,561 (filed 09/09/94), which application is a CON of S.N. 08/060,470 (filed 05/11/93, now ABN), which application is a CON of S.N. 07/875,003 (filed 04/24/92, now ABN), which application is a DIV of S.N. 07/053,307 (filed 05/22/87, now ABN).--.

In claim **436**, line 2, delete "or 432".

In claim **616**, line 1, change "claim 698" to --claim 608--.

In claim **620**, line 1, change "claim 618" to --claim 612--.

In claim **578**, line 2, delete "rare-earth characteristic" and replace with --a property which make it essentially a rare earth element--.

In claim **622**, line 2, delete "rare-earth characteristic" and replace with --a property which make it essentially a rare earth element--.

In claim **659**, lines 2-3, delete "rare-earth characteristic" and replace with --property which make it essentially a rare earth element--.

In claim **585**, line 2, delete "an apparatus, a device and a combination" and replace with --a machine and an article of manufacture--.

In claim **591**, line 2, delete "a device, an apparatus, a circuit and a combination" and replace with --a machine and an article of manufacture--.

In claim **629**, line 2, delete "an apparatus, a device and a combination" and replace with --a machine and an article of manufacture--.

In claim **635**, line 2, delete "a device, an apparatus, a circuit and a combination" and replace with --a machine and an article of manufacture--.

**Add** the following new claims:

-- CLAIM 660 (New)    A structure comprising:

a coil comprising a material    comprising a  $T_c$  greater than or equal to 26°K possessing a persistent current~~+~~

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

CLAIM 661(New) An structure according to claim 660 further including a temperature controller capable of maintaining said material at a temperature less than or equal to said  $T_c$ .

CLAIM 662(New) A structure according to claim 660 wherein said material is capable of being at a temperature less than or equal to said  $T_c$  and greater than or equal to 26°K.

CLAIM 663(New) A structure according to claim 660 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to  
an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon  
interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons  
in said material,

a distorted crystalline structure characterized by an  
oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoichiometric oxygen content,

a non-stoichiometric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in  $\text{Cu}^{3+}$  ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in  $\text{Cu}^{3+}$  ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both  $\text{Cu}^{2+}$  and  $\text{Cu}^{3+}$  ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula  $Ba_xLa_{x-5}Cu_5O_y$  wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal

oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $\text{BaLa}_{5-x}\text{Cu}_5\text{O}_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

CLAIM 664(New) A structure according to claim 660, wherein said transition metal is selected from the group consisting of copper, nickel and chromium.

CLAIM 665(New) A structure according to claim 660 wherein said rare-earth like elements include a property which make it essentially a rare earth element.

CLAIM 666(New) A structure according to claim 660 wherein said composition comprises one or more of Be, Mg, Ca, Sr, Ba, Ra, Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu.

CLAIM 667(New) A structure according to claim 660 wherein said composition comprises one or more of one or more of Be, Mg, Ca, Sr, Ba and Ra and one or more of Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu.

CLAIM 668(New) A structure according to claim 660 wherein said material can be made according to known principles of ceramic science.

CLAIM 669(New) A structure according to claim 660 wherein said material comprises a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound.

CLAIM 670(New) A structure according to claim 660 wherein said material comprises a metallic, oxygen-deficient, perovskite-like, mixed valent copper compound.

CLAIM 671(New) A structure according to claim 660 wherein said material comprises a multiphase material wherein at least one phase possesses said persistent current.

CLAIM 672(New) A structure according to claim 660 wherein said structure is selected from the group consisting of a machine and a article of manufacture.

CLAIM 673(New) A structure according to claim 660 wherein said material comprises at least one element selected from each of said first element group and said second element group.

CLAIM 674(New) A structure according to any one of claims 660 to 672 or 673 wherein said structure is selected from the group consisting of:

- a power generation device,
- an electrical power transmission device,
- an electrical power transmission element,
- a coil,
- a magnet,
- a plasma device,
- a nuclear device,
- a nuclear magnetic resonance device,
- a nuclear magnetic imaging device,
- a magnetic levitation device,
- a power generation system,
- a thermonuclear fusion device,
- a switching device,
- a Josephson junction device,
- an electrical packaging device,
- a circuit device,
- a electronic instrumentation device,
- a train,
- a magnetic suceptomoter, and
- a magnetometer.

CLAIM 675(New) A structure according to claim 660 wherein said structure is capable of magnetic levitation.

CLAIM 676(New) A structure comprising:

a coil comprising a material having a  $T_c$  greater than or equal to 26°K possessing a persistent current~~+~~

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

CLAIM 677(New) A structure comprising:

a coil comprising a material with a  $T_c$  greater than or equal to 26°K possessing a persistent current~~+~~

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

CLAIM 678(New) A structure comprising:

a coil comprising a material possessing a  $T_c$  greater than or equal to 26°K possessing a persistent current~~+~~

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

CLAIM 679(NEW) An apparatus according to claim 432, wherein said composition can be made according to known principles of ceramic science.--.

Authorization for this examiner's amendment was given in a telephone interview with Dr. Daniel P. Morris on 06/20/11.

The following is an examiner's statement of reasons for allowance:

The instant claims are allowed for the reasons set forth in the reply filed 02/22/11.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARK KOPEC whose telephone number is (571)272-1319. The examiner can normally be reached on Monday - Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon can be reached on (571) 272-1498. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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MK  
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